Andlus UNIVERSITY

FACULTY OF INFORMATION TECHNOLOGY

Quality Assurance Unit (QUA)

DEPARTMENT OF INFORMATION TECHNOLOGY

PROGRAM OF INFORMATION TECHNOLOGY

Course Specification of data structure

Semester Second year Second

2014

Template for Course Specification

I. Course Identification and General Information:

1	**Course Title:**	**Data structure**				
2	**Course Code &Number:**					
3	**Credit hours: 3**	C.H				TOTAL
		Th.	Seminar	Pr	Tr.	
		2	**-**	***2***	**-**	***4***
4	**Study level/Semester at which this course is offered:**	**2st year – 2nd Semester**				
5	**Pre –requisite (if any):**	**Computer Programming 1**				
6	**Co –requisite (if any):**	**N/A**				
7	**Program (s) in which the course is offered:**	**Program in INFORMATION TECHNOLOGY**				
8	**Language of teaching the course:**	**English/Arabic**				
9	**Location of teaching the course:**	**Class and Lab**				
10	**Prepared By:**	**Dr. Saleh Alasali**				
11	**Date of Approval**					

II. Course Description:

This course includes review of one and two dimension Arrays, user defined data structure, static user defined data structure, dynamic memory allocation, building linked lists with dynamic memory allocation, building queue, stack as a lists , building double linked lists, and building binary trees.

III. Intended learning outcomes (ILOs) of the course:

By the end of the subject, students should be able to:

1. Identify the prime rules of data structure . A1
2. Draw and explain several types of data structure. A2
3. Perform dynamic memory allocation. B1
4. Deal with dynamic memory allocation to build data structure. B2
5. Build user defined data structure with dynamic memory allocation. C1
6. Build several types of data structure. C2
7. Use suitable type of data structure to solve some problems. D1

(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
A1- Identify the prime rules of data structure	**Lecture** The lecturer describes the prime rules of data structure	Mid-term exam Final Exam Homework Reports
A2- Draw and explain several types of data structure.	**Lecture and LAP** The lecturer deals with Pointers and describes how to write programs with Pointers in (C++)	Mid-term exam Final Exam Homework Reports

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
B1 Perform dynamic memory allocation and deal with dynamic memory allocations.	**Lecture and LAP** The lecturer deals with dynamic memory allocation	Mid-term exam Final Exam Homework Reports
B2- Deal with dynamic memory allocation to build data structure	**Lecture and LAP** The lecturer describes some rules of dealing with dynamic memory allocation to build data structure and how to write programs in this regard.	exam Final Exam Homework Reports

(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
C1- Build user defined data structure with dynamic memory allocation	**Lecture and LAP** The lecturer describes types of user defined data structures with dynamic memory allocation and describes how to write programs in this regard.	Practical Exam Write a program and execute it in the lab Homework
C2- Build several types of standard data structure with dynamic memory allocation	**Lecture and LAP** The lecturer describes types of standard data structures with dynamic memory allocation and describes how to write programs in this regard.	Practical Exam Write a program and execute it in the lab Homework

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
D1- Use suitable type of data structure to solve some problems	**Group Discussion**	**Presentation** **Project**

IV. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	Review of using Arrays	A,B ,C	Deal with one and two dimensions Arrays.	2	4
2	Define user data structure	A,B ,C	Define user data structure(static), struct and struct array of struct.	2	4
3	Dynamic memory allocation	A,B ,C	Deal with Dynamic memory allocation	1	2
4	Building of dynamic linear Linked lists Building of dynamic linear queue and stack.	A,B ,C	Building of dynamic linear Linked lists, Adding and deleting node(s) to/from dynamic linear linked lists.	2	4
			Building of dynamic linear queue and stack, Adding and deleting node(s) to/from dynamic linear queue and stack.	2	4
6	Building of dynamic circular Linked lists	A,B ,C	Building of dynamic circular Linked lists , Adding and deleting node(s) to/from dynamic circular linked lists.	1	2
7	Building of dynamic circular queue and stack.	A,B ,C	Deal with one and two dimensions Arrays.	1	2
	Building of double Linked lists	A,B ,C	Building of double Linked lists, Adding and deleting node(s) to/from double Linked lists	1	2
	Building of Binary trees		Building of Binary trees, Adding node(s) to Binary trees, traverse Binary trees	2	4
Number of Weeks /and Units Per Semester				14 week	28

B - Practical Aspect: (if any)				
Order	**Tasks/ Experiments**	**Number of Weeks**	**contact hours**	**Learning Outcomes**
1	**Programs deal with two** dimensions array loops	**1**	**2**	**A,B,C**
2	**Programs deal with user data struct**	**1**	**2**	**A,B,C**
3	**Programs to build dynamic linear Linked lists, Adding and deleting node(s) to/from dynamic linear linked lists**	**2**	**4**	**A,B,C**
4	**Programs to build dynamic queue and stack.**	**2**	**4**	**A,B,C**
5	**Programs to build dynamic circular queue and stack.**	**2**	**4**	**A,B,C**
6	**Programs to build dynamic double Linked lists**	**2**	**4**	**A,B,C**
7	**Programs to build dynamic binary trees**	**2**	**4**	**A,B,C**
Number of Weeks /and Units Per Semester		**12**	**24**	

V. Teaching strategies of the course:

Lecture ,Discussion, Case study, Project ,Presentation

VI. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	**Programs deal with two** dimensions array loops	A,B,C	2	1
2	**Programs deal with user data struct**	A,B,C	3	1
3	**Programs to build dynamic linear Linked lists, Adding and deleting node(s) to/from dynamic linear linked lists**	A,B,C	5	1
4	**Programs to build dynamic queue and stack.**	A,B,C	7	2
5	**Programs to build dynamic circular queue and stack.**	A,B,C	10	1
6	**Programs to build dynamic double Linked lists**	A,B,C	12	2
7	**Programs to build dynamic binary trees**		14	2

VII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Homework		10	10%	A,B,C
2	Quizzes		5	5%	
3	Mid-term exam (practical)		5	5%	
4	Mid-term exam (theoretical)		15	15%	
5	Lab-reports				
6	Final exam (practical)		15	15%	
7	Final exam (theoretical)		50	50%	
8					
9					

VIII. Learning Resources:

- *Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).*

1- Required Textbook(s) (maximum two).

1. Goodrich, M and Tamassia, R., "*Data Structures and Algorithms in C++*", John Wiley & Son 4rd Edition, 2009.
2. Main, N. "*Data Structures and Other Objects Using Java*", Addison Wesley, 2003.

2- Essential References.

1- Rowe, G., *"An Introduction to Data Structures and Algorithms with Java*", Prentice Hall, 1998.

2- Budd, T., "*Understanding Object-Oriented Programming Using Java*", Addison-Wesley, 2000.

3- Recommended Books and Reference Materials.

1.
2.
3.
4.
5.

4- Electronic Materials and Web Sites *etc*.

1.
2.
3.

5- Other Learning Material.

1.
2.
3.

IX. Course Policies:	
1	**Class Attendance:** -
2	**Tardy:** -
3	**Exam Attendance/Punctuality:** -
4	**Assignments & Projects:** -
5	**Cheating:** -
6	**Plagiarism:**
7	**Other policies:** -

Template for Course plan (Syllabus)

I. - Information about Faculty Member Responsible for the Course:								
Name of Faculty Member	D/Sleh Alasali	**Office Hours**						
Location&Telephone No.	Sana'a 711914448	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**	
E-mail								

11 Course Identification and General Information						
1	**Course Title:**	**Data structure**				
2	**Course Code &Number:**					
3	**Credit hours: 3**	C.H				TOTAL
		Th.	Seminar	Pr	Tr.	
		2	*-*	*2*	*-*	*4*
4	**Study level/Semester at which this course is offered:**	**2st year - first Semester**				
5	**Pre –requisite (if any):**	**Programming 2**				
6	**Co –requisite (if any):**	**N/A**				
7	**Program (s) in which the course is offered:**	**Program in Computer network**				
8	**Language of teaching the course:**	**English/Arabic**				
9	**Location of teaching the course:**	**Class and Lab**				
10	**Prepared By:**	**Dr. Saleh Alasali**				
11	**Date of Approval**					

X. Course Description:

This course includes review of one and two dimension Arrays, user defined data structure, static user defined data structure, dynamic memory allocation, building linked lists with dynamic memory allocation, building queue, stack as a lists , building double linked lists, and building binary trees.

XI. Intended learning outcomes (ILOs) of the course:

By the end of the subject, students should be able to:

1. Identify the prime rules of data structure . A1
2. Draw and explain several types of data structure. A2
3. Perform dynamic memory allocation. B1
4. Deal with dynamic memory allocation to build data structure. B2
5. Build user defined data structure with dynamic memory allocation. C1
6. Build several types of data structure. C2
7. Use suitable type of data structure to solve some problems. D1

(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
A1- Identify the prime rules of data structure	**Lecture** The lecturer describes the prime rules of data structure	Mid-term exam Final Exam Homework Reports
A2- Draw and explain several types of data structure.	**Lecture and LAP** The lecturer deals with Pointers and describes how to write programs with Pointers in (C++)	Mid-term exam Final Exam Homework Reports

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
B1 Perform dynamic memory allocation and deal with dynamic memory allocations.	**Lecture and LAP** The lecturer deals with dynamic memory allocation	Mid-term exam Final Exam Homework Reports
B2- Deal with dynamic memory allocation to build data structure	**Lecture and LAP** The lecturer describes some rules of dealing with dynamic memory allocation to build data structure and how to write	exam Final Exam Homework

	programs in this regard.	Reports

(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
C1- Build user defined data structure with dynamic memory allocation	**Lecture and LAP** The lecturer describes types of user defined data structures with dynamic memory allocation and describes how to write programs in this regard.	Practical Exam Write a program and execute it in the lab Homework
C2- Build several types of standard data structure with dynamic memory allocation	**Lecture and LAP** The lecturer describes types of standard data structures with dynamic memory allocation and describes how to write programs in this regard.	Practical Exam Write a program and execute it in the lab Homework

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
D1- Use suitable type of data structure to solve some problems	**Group Discussion**	**Presentation** **Project**

Order	List of Topics	Week due	contact hours
1	**Deal with one and two dimensions Arrays.**	1,2	4
2	**Define user data structure(static), struct and struct array of struct.**	3,4	4
3	**Deal with Dynamic memory allocation**	5	2
4	**Building of dynamic linear Linked lists, Adding and deleting node(s) to/from dynamic linear linked lists.**	6,7,8	6
	Made term exam	9	2
5	**Building of dynamic linear queue and stack, Adding and deleting node(s) to/from dynamic linear queue and stack.**	10	2
6	**Building of dynamic circular Linked lists , Adding and deleting node(s) to/from dynamic circular linked lists.**	11,12	4
	Building of double Linked lists, Adding and deleting node(s) to/from double Linked lists	13	2
	Building of binary tree, Adding and span trees	14,15	4
7	Final exam	16	2
	Number of Weeks /and Units Per Semester	16	32

B - Practical Aspect: (if any)

Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
1	**Programs deal with two** dimensions array loops	1	2	A,B,C
2	**Programs deal with user data struct**	1	2	A,B,C
3	**Programs to build dynamic linear Linked lists, Adding and deleting node(s) to/from dynamic linear linked lists**	2	4	A,B,C
4	**Programs to build dynamic queue and stack.**	2	4	A,B,C
5	**Programs to build dynamic circular queue and stack.**	2	4	A,B,C
6	**Programs to build dynamic double Linked lists**	2	4	A,B,C
7	**Programs to build dynamic binary trees**	2	4	A,B,C
Number of Weeks /and Units Per Semester		12	24	

XII. Teaching strategies of the course:

Lecture ,Discussion, Case study, Project ,Presentation

XIII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	**Programs deal with two** dimensions array loops	A,B,C	2	1
2	**Programs deal with user data struct**	A,B,C	4	1
3	**Programs to build dynamic linear Linked lists, Adding and deleting node(s) to/from dynamic linear linked lists**	A,B,C	7	2
4	**Programs to build dynamic queue and stack.**	A,B,C	8	1
5	**Programs to build dynamic circular queue and stack.**	A,B,C	10	1
6	**Programs to build dynamic double Linked lists**	A,B,C	12	1

7	**Programs to build dynamic binary trees**	A,B,C	14	3

XIV. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Homework		10	10%	A,B,C
2	Quizzes		5	5%	
3	Mid-term exam (practical)		5	5%	
4	Mid-term exam (theoretical)		15	15%	
5	Lab-reports				
6	Final exam (practical)		15	15%	
7	Final exam (theoretical)		50	50%	
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XV. Learning Resources:

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2. Main, N. "*Data Structures and Other Objects Using Java*", Addison Wesley, 2003.

2- Essential References.

1. Rowe, G., *"An Introduction to Data Structures and Algorithms with Java*", Prentice Hall, 1998.
2. Budd, T., "*Understanding Object-Oriented Programming Using Java*", Addison-Wesley, 2000.

3- Recommended Books and Reference Materials.

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4- Electronic Materials and Web Sites *etc*.

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5.
6.

5- Other Learning Material.

12
13
14

XVI. Course Policies:	
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2	**Tardy:** -
3	**Exam Attendance/Punctuality:** -
4	**Assignments & Projects**: -
5	**Cheating**: -
6	**Plagiarism**:
7	**Other policies**: -